gories," or "a synoptical survey of the grand human bi-directional spiral," are disturbing, and may well be forbidding, to general readers.

Still, Mr. Branford takes a clear and strong view upon certain points which vitally concern the theory of government. Nothing can be better than the passage in which he defines the guiding spirit of the new era (p. 143). It is almost too late to advocate now the rights of women; for womanhood has already entered upon its political heritage; but he rightly bases the enfranchisement of women upon their interest, which is at least equal to men's, in the good order of the State (p. 28). Mr. Branford will carry the assent of all wise thinkers in proposing "to drop the rootedly false distinction between manual work and brain work," a distinction which "has worked so fatally and so long against the humanisation of all labour, against its higher productivity, and against the social solidarity and happiness of mankind" (p. 100). All that he says about Labour is worthy of serious regard. It is only right, too, to express an acknowledgment of the passages (for example, on pp. 79 and 80) in which he defines the successive relations between the family and the city, the region, the nation, the State, and humanity as a whole.

But when the book is judged in the light of its title, as "a new chapter in the science of government," it cannot be said that Mr. Branford's positive reforms are altogether convincing. The most original of them seems to be an inference which he draws from the "warp and weft," as he calls them, of society, *i.e.* the geographical or regional and the occupational or industrial divisions of mankind. He sees clearly that, so long as mankind is distributed geographically into countries or nations, and into these alone, patriotism itself must be exposed, as it was in Germany, to the danger of assuming a selfish, violent, and aggressive character. He finds, or hopes to find, a counter-balancing force in the various occupations of mankind. Thus if all Englishmen are naturally united in the cause of England, the miners or the railwaymen, not in England alone, but all the world over, may be united in support of their own industry. There will then be an international or cosmopolitan sense balancing the local patriotic sense of particular countries. This is, or was in the days before the war, the idea of the Labour Party; but when the war broke out, even the Socialists in Germany suffered their vocational or occupational feeling to be merged in their patriotism; and so it remained, at least until the scales of victory began to incline against the German Empire.

Mr. Branford looks forward to a "Grand Council of Humanity," which he conceives as "a world-bicameral legislature," containing, after the manner of the British Constitution, two Chambers, the Lower being geographical and the Upper occupational; and it is through this Grand Council that he hopes to attain the solution of the political, social, and industrial problems which are now dislocating the civilised world. Upon the whole, if Mr. Branford cannot be said to have made a solid contribution to political science, he has thrown out a good many suggestive ideas which may well bear fruit in the political history of the new-born age.

J. E. C. WELLDON.

AMERICAN BOOKS ON AGRICULTURE.

(1) *Productive Agriculture.* By Prof. John H. Gehrs. Pp. xii+436. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1917.) Price 5*s.* 6*d.* net.

(2) *Farm Concrete.* By K. J. T. Ekblaw. Pp. xi+295. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1917.) Price 8*s.* 6*d.* net.

(3) *Peach-growing.* By H. P. Gould. (The Rural Science Series.) Pp. xxi+426+xxxii plates. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1918.) Price 10*s.* 6*d.* net.

(1) FROM the house of the Macmillan Co., of New York, there issues a constant flow of good agricultural books, and it is gratifying to find that the three now to hand are fully equal to some of their predecessors.

The first book, by Prof. J. H. Gehrs, of the Warrensburg State Normal School of Montana, is written for school children of the upper classes who propose to take up farming as the business of their life. It is frankly vocational: "this is not primarily a book *about* agriculture, but one *on* 'Productive Agriculture.' . . . Unless this book helps to increase the average yields, improve stock, make for better and more fruit, and promote better farm management, it will have failed of the purpose for which it was written."

It may at once be stated that the book deserves to achieve success. The subject-matter is very interesting; the book is full of bits of old country-lore that always make a strong appeal to the country child and the countryman, and the information so far as we can see is sound. Under the heading "Wheat," for instance, the author gives a chart showing the production in bushels of the more important wheat countries of the world with the percentage that each contributes to the world's total. This brings out in striking manner the fact that Europe normally contributes 51·4 per cent. of the world's wheat—a sufficient explanation of the present scarcity. North America contributes only 27·6 per cent.—little more than European Russia. A chart is then given to show the production in certain of the States. North Dakota and Kansas easily come first, followed by Nebraska, Minnesota, Washington, etc. In yield per acre it is gratifying to note that Great Britain stands first with 33·4 bushels, followed by Germany with 30·7, France with 20·1, and the United States with 15 bushels. The cost of production per bushel is stated to be lower in Great Britain than elsewhere; but to this English farmers might not agree. The low position of the United States is not to the author's liking: "Why European countries produce larger yields an acre than the United States is an important question for study. Our natural resources are ordinarily as great as those of European countries."

America scores, however, in the efficiency of the farm labourers and the use of machinery. The portrait of Cyrus H. McCormick, who devised the modern reaper and thus revolutionised the growth of wheat, occupies a prominent place in the book, and much space is rightly devoted to machinery. A table is introduced showing how the time required of man labour to produce and thresh a bushel of wheat has fallen since 1832 from 3½ hours to 10 minutes only, and the cost of the labour has fallen from 17¾ cents to 3⅓ cents. Maize naturally claims a good deal of attention as the most important farm crop in the States in respect both of money value and of food value. The United States contributes no less than 78 per cent. of the world's supply; Iowa and Illinois are the largest producers, but Indiana, Nebraska, Missouri, and Ohio grow large amounts; these and Kansas constitute the famous "corn belt" of the States. Of oats, as of wheat, Europe is the chief producer, growing no less than 61·2 per cent. of the world's total; but in point of yield Germany comes first with 57·4 bushels, followed by the United Kingdom with 44·7, France with 30, and the United States with 29·4 bushels. Later chapters deal with animals; the style is equally good, and the matter equally interesting; a brief history of the principal breeds of live stock is given, with descriptions of their characteristics, valuable features, and methods of treatment. Next come sections on the soil, laying special stress on physical properties, then sections on fertilisers, and finally chapters on choosing a farm.

Altogether the book is one of the most successful for its purpose we have yet seen, and we imagine it will make a vivid appeal to the American students for whom it is written.

(2) The other two books are more specialised. Mr. Ekblaw writes about farm concrete, a subject of which we are likely to hear much more in this country in the future, for the making of concrete requires only sand, cement, and grave (or similar substances); it can be moulded to almost any shape and adapted to almost any farm building purpose. The author deals with natural cement, made by calcining and then pulverising natural argillaceous limestone without preliminary mixing and grinding; and Portland cement or artificial cement, made by mixing finely ground argillaceous and calcareous materials in proportions approximately of three parts of calcium carbonate to one of silica, alumina, and iron oxide, then calcining and finely pulverising. Portland cement, it is interesting to note, was invented by an Englishman, Joseph Aspdin, in 1824, and for many years we led the way in its manufacture; but now the United States leads, surpassing all other countries both in manufacture and in use. Several varieties of concrete are made, but the constituents are always cement, a fine aggregate (usually sand) and a coarse aggregate (usually pebbles or broken stones), the purpose of the fine material being to save cement by filling up more closely the pore spaces; an apparatus called the voidmeter is described for estimating the amount of pore spaces of different materials. Reinforced concrete as used for buildings is concrete in which steel or other material is embedded to increase its strength. It was invented by a French gardener, Jean Monier, in 1876, and has proved very successful. Its use is still somewhat empirical, the underlying principles not being quite understood, but sufficient useful knowledge has been gained to reveal its great promise for the future.

Great stress is laid on the fire-resistant properties of concrete for building purposes. The building regulations in New York are severe; a building to be considered fireproof must withstand when fully loaded a temperature of 1700° for four hours, and then be subjected to a stream of water discharged from a 1⅛-in. nozzle under a pressure of 60 lb. without failure. A number of systems of reinforced concrete have successfully passed the test.

The rest of the book is devoted to the special purposes for which concrete can be used on the farm. For building purposes it takes the place of both brick and wood; it can be used for buildings, posts, mangers, floors, yards, and the farmhouse itself. The book will be of great interest to country builders and estate agents who wish to build as cheaply and quickly as possible.

(3) The last book on the list, "Peach-growing,"

by Mr. H. P. Gould, follows the same lines as the other special crop-books of the Rural Science Series, of which Dr. L. H. Bailey is the editor. It is a worthy member of the series. Opening with an account of the history and economic position of the crop, the author proceeds to discuss the details of laying out and managing a peach orchard, the pests, and other details which the intelligent grower ought to know. References are given to bulletins of colleges and agricultural experiment stations, where further information can be gained.

HANDBOOKS OF CHEMISTRY.

(1) *Senior Practical Chemistry.* By H. W. Bausor. Pp. viii+217. (London: W. B. Clive. University Tutorial Press, Ltd., 1919.) Price 3*s.* 6*d.*

(2) *Volumetric Analysis for Students of Pharmaceutical and General Chemistry.* By Charles H. Hampshire. Second edition. Pp. 127. (London: J. and A. Churchill, 1919.) Price 5*s.* net.

(3) *The Preparation of Substances Important in Agriculture: A Laboratory Manual of Synthetic Agricultural Chemistry.* Third edition. By Prof. Charles A. Peters. Pp. vii+81. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1919.) Price 4*s.* net.

(4) *Salt and the Salt Industry.* By Albert F. Calvert. (Pitman's Common Commodities and Industries.) Pp. vii+151. (London: Sir Isaac Pitman and Sons, Ltd., n.d.) Price 2*s.* 6*d.* net.

(5) *Industrial Chemistry.* By Dr. Clerk Ranken. (The People's Books.) Pp. 126. (London and Edinburgh: T. C. and E. C. Jack, Ltd.; T. Nelson and Sons, Ltd., 1919.) Price 1*s.* 3*d.*

(1) THESE small books differ from each other perhaps as widely as it is possible for five chemical books to differ, except in one matter, namely, that each author seems to be fully competent to deal with his subject. Mr. Bausor disclaims responsibility for the character of the course of work given in his "Senior Practical Chemistry," as it is designed to meet the requirements of the Senior Cambridge Local Examination in Practical Chemistry. We may be old-fashioned, but we still think that the qualitative character of things should be studied before an attempt is made to estimate their quantity. To say the least of it, it appears strange to us that a student, after having made preparations and done experiments some of which demand considerable manipulative skill, should then be instructed how to bend and cut glass tubing, and how to take small quantities of materials out of bottles by means of a spatula. But we suppose that this is a matter of the syllabus. The final section deals with qualitative analysis, but only so far as the detection of the acid and the base of a single salt.

(2) The title of Mr. Hampshire's manual sufficiently indicates its scope. This author also works to a syllabus, but one that is much more definite and restricted than in the preceding case. In order to make the volume more generally useful, the applications of methods to substances that may be of little importance to those who are not students of pharmacy are printed in smaller type. But the majority of these will be found of interest to any earnest student of analytical chemistry, and those who have to direct their work will find in these small-print examples an excellent help towards getting out of the ruts that "laboratory work" is so apt to suffer from.

(3) The three other volumes differ from the first two in that the authors are not guided by syllabuses prepared by others. Prof. Peters gives within his few pages of large type a really surprising amount of information. The substances of which the preparation on a laboratory scale is described are superphosphate, ammonium sulphate, four potassium salts, lead nitrate, lead arsenate, lime-sulphur (the product of boiling lime and sulphur together in water), copper sulphate, Paris green, Bordeaux mixture, and paraffin oil emulsions. But the book will prove far more interesting than if it consisted merely of these practical directions. The use and manner of action of each substance are referred to, or of each constituent of a mixture, and the reason for employing the mixture rather than the single active substance. The last line of the preface informs us that "a few simplified spellings have been used." We have failed entirely to find consistency in these simplifications. *Ph* is replaced by *f* in *sulphate,* but not in *phosphate.* Final *e's* are sometimes omitted, but by no means always, and the same may be said of the *e* in the final syllable *ed. Coold, cald, lims, eg, brot, floc, thot, enuf, thru, volum* are examples of the simplifications, while, on the other hand, the author uses *feldspar,* although in this country the *d* has been omitted for more than a generation. These peculiarities mar the book, for they cannot fail to distract attention from the main subject. A students' manual of chemistry is not the place to introduce spelling reforms.

(4) Mr. Calvert, in his monograph on "Salt," restricts himself almost entirely to the history of the Cheshire salt district and its industry. The scant treatment of this subject at the hands of authors in general is ascribed to the comparatively